

The Pension Gap Epidemic

CHALLENGES AND RECOMMENDATIONS



OCTOBER 2016

The Geneva Association

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The Pension Gap Epidemic

Challenges and Recommendations

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Foreword



Anna Maria D'Hulster

*Secretary General,
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Mortality rates have been improving since accurate statistics have been recorded. But in the middle of the 20th century, medical technology and the introduction of vaccinations for diseases such as tetanus, tuberculosis, influenza, measles, mumps and rubella have massively improved health outcomes.

This is a tremendous societal achievement but it also creates a significant challenge. This dynamic and ongoing improvement in life expectancies is not currently accounted for in the social systems, such as public and private pension funds, designed to provide financial security in retirement. At the same time, fertility rates have dropped to historically low levels in most countries and there are not enough workers to support the increasing number of retirees in pay-as-you-go pensions systems. For example, last year, there were four workers for every person aged 65 or more in the European Union but by 2050, there will be just two, according to Eurostat estimates¹.

Furthermore, in countries where established retirement funding solutions exist, trustees have relied almost completely on investment returns to sustain their funds. But the consequences of the Global Financial Crisis in the form of long-term low interest rates and faltering growth have significantly limited investment returns, exacerbating pension shortfalls. In the U.S., after years of not setting aside enough money, state and local pension funds are looking at a \$1.5 trillion shortfall in what they owe workers in benefits, according to a 2016 analysis² from The Pew Charitable Trusts.

Thus the problems in the longevity gap are significant and chronic, requiring far-reaching and potentially unpopular structural reforms. But as the most serious consequences of this crisis lie in the future and extend far beyond the political cycle, there is little appetite (and support) for the kind of holistic political and legislative reforms required.

In this paper, The Geneva Association explores possible solutions to mitigate this growing Pension Gap Epidemic and highlights the potential role of the private sector in addressing it. No single stakeholder can address this challenge alone and adequate solutions will require a concerted effort (and perhaps compromise) from governments, corporations and individuals alike. The report therefore also provides an holistic overview of a series of other steps that address the challenge created by this otherwise remarkable human achievement.

¹ http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing

² <http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2016/08/the-state-pension-funding-gap-2014>



Executive Summary

The Merriam Webster Dictionary defines epidemic as a situation 'affecting or tending to affect a disproportionately large number of individuals within a population, community, or region at the same time'. We will show in this paper that the pension gap is truly an epidemic (see Figure 1). The bad news is that it is currently spreading and getting worse. The good news is that, like most epidemics, it can be effectively controlled.

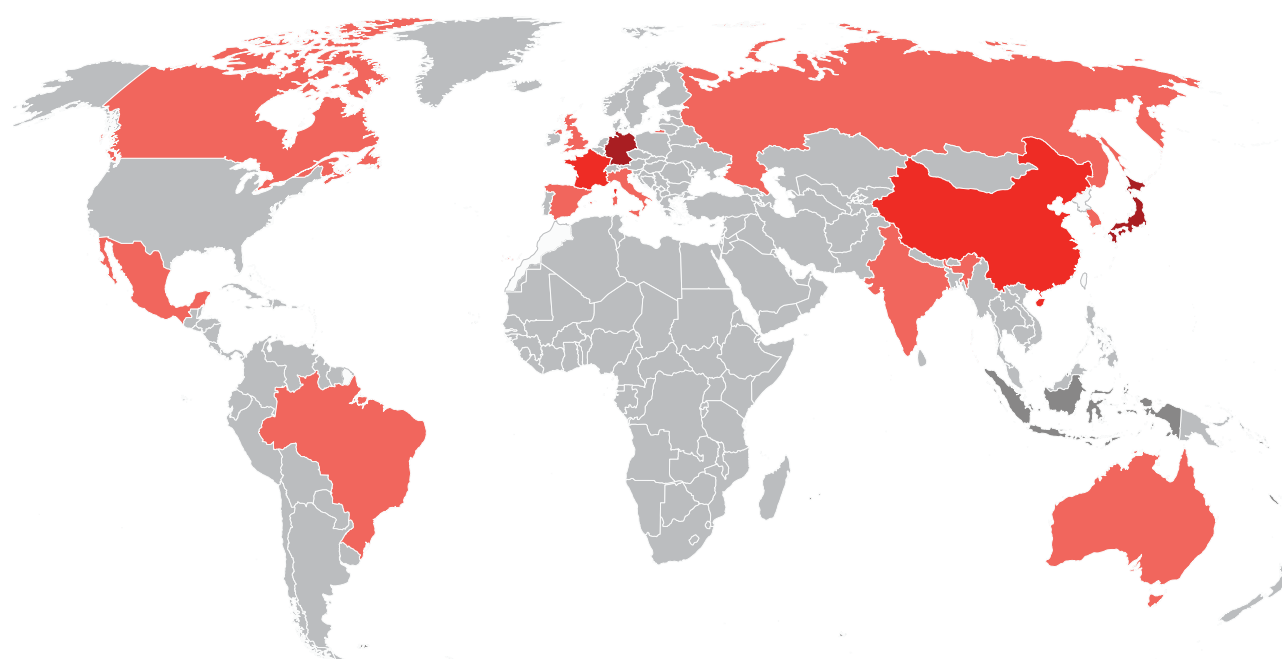
The pension gap is defined as the difference between the present value of the yearly lifetime income needed to sustain a reasonable standard of living and the actual

amount that is saved for retirement plus the present value of pay-as-you-go (PAYG) contributions. The present value is over a 40-year period.

The major drivers of the current pension gap are improving worldwide life expectancies and low support ratios caused by the low number of births on average per woman aged 15–44 (fertility rate). In its World Mortality Report 2013, the UN illustrates how global life expectancy increased from 46.9 years in 1955 to 64.8 in 1995 to 70 in 2015, and is projected to reach 80 in 2050³. The UN also reports that fertility rates in 1955, 1995 and 2015 were 5.0, 3.0 and 2.5,

This paper is using an estimate of **USD 41 trillion** as the current pension gap.

Figure 1: Pension Gap by Country (USD 41 Trillion Estimate)



□ No data ■ <0.49 ■ 0.5–0.74 ■ 0.75–4.9 ■ 5.0–7.9 ■ >8.0

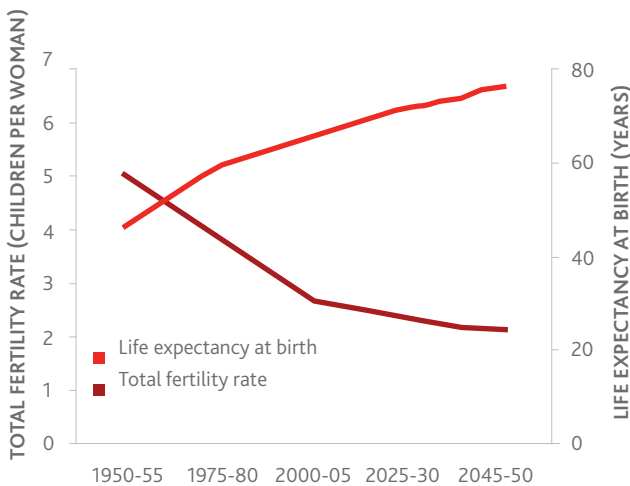
Source: Based upon a 60% wage replacement ratio, Richard Marin's Pension Gap calculation in his book *Global Pension Crisis: Unfunded Liabilities and how we can Fill the Gap*¹, and an OECD estimate of pay as you go pension funding².

¹ Marin, R. (2013) *Global Pension Crisis: Unfunded Liabilities and How We Can Fill the Gap*, Hoboken, NJ: John Wiley & Sons, Inc.

² OECD (2016) Pension Spending (indicator). doi: 10.1787/a041f4ef-en (accessed on 5 July 2016).

³ United Nations, Department of Economic and Social Affairs (DESA), Population Division (2013) *World Mortality Report 2013*. Available at http://www.un.org/en/development/desa/population/publications/pdf/mortality/WMR2013/World_Mortality_2013_Report.pdf

Figure 2: Total Fertility Rate and Life Expectancy at Birth: World, 1950–2050



Source: United Nations, DESA (2001) *World Population Ageing 1950-2050*

respectively and are expected to drop to 2.0 in 2050⁴, as illustrated by Figure 2.

The main consequence of the pension gap is old-age poverty. Not only does old-age poverty put a drain on government finances, it destroys an important element in society that people should retire with dignity.

Factors explored in this paper that can cause shocks to the current gap are continued low interest rates, pandemic flu, a cure for cancer, and climate change.

Possible solutions to help mitigate the effects of the current pension gap are:

1. Employer **defined contribution pensions** should, at a minimum, **automatically enrol workers** and at a high enough level to ensure adequate retirement income.
2. Governments should further encourage retirement contributions with additional **tax-advantaged savings opportunities**.

3. Governments should strongly encourage or mandate **annuitisation** of all or a large portion **of employer defined contribution plans**.
4. **Retirement ages** to receive unreduced social pensions should continue to increase commensurate with the **increase** in life expectancy.
5. Governments and the industry should create **more opportunities** to allow **work past normal retirement age**.
6. **Contribution rates for social pensions should increase for employers and individuals** until, in conjunction with other solutions, the national system is sustainable based upon realistic actuarial assumptions. In addition, all defined benefit plans should be funded to the actuarially correct levels.
7. Governments should be required to **disclose current pension funding gaps and show expected benefits** to future retirees under best estimate assumptions.
8. **Financial literacy** should be part of core **education** systems around the world or should be taught in schools by insurance industry organisations, trade associations and educators.

Other possible ideas are:

1. Needs test for social pension recipients,
2. Improved incentives to increase fertility rates such as child allowances and tax breaks in countries with persistently low fertility rates,
3. Central banks use of monetary policies to increase interest rates,
4. Embracing immigration of younger people into rapidly ageing countries,
5. Creation of industry products that have low fees,

⁴ United Nations, Department of Economic and Social Affairs (DESA), Population Division (2013) *World Population Ageing 2013*, Doc. ST/ESA/SER.A/348. Available at <http://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2013.pdf>

guaranteed minimum lifetime income and are simple to understand,

6. Mandated small life insurance policies for people with dependents, and
7. The general public taking more responsibility for their retirement by learning and saving more.

Some of the recommended solutions could cause other issues such as placing further demands on younger workers to finance current retirees or what is called inter-generational wealth transfer and difficulty of politicians to change policies that reduce current pension benefits due to the ageing population that has a high voter turnout.

Box 1: Important definitions

- **Pillar I pensions** — Government paid benefits to retirees typically based upon number of years of employment, salary and age when benefits are received in the form of a monthly payment—also called social pensions.
- **Pillar II pensions, public** — Benefits paid to retirees for governmental workers and can be in the form of monthly payments for life (defined benefit plans) or contributions to a savings account (defined contribution plans) to which the employee and employer usually contribute (combined with Pillar I pensions, this may be referred to a governmental pensions).
- **Pillar II pensions, private** — Same as Pillar II, public except that the employer is a company, not a governmental organization.
- **Pillar III pensions** — Private savings in any form including cash, bonds, stocks, mutual funds, real estate, that is not part of a Pillar I or Pillar II pensions.
- **Retirement Age** — Also called normal retirement age, it is typically considered to be age 65 unless noted differently. In some countries the retirement age is mandatory, while in other countries, this is the age at which Pillar I pensions begin without reduction.

The Pension Gap Epidemic

The history of the pension

Otto Eduard Leopold's rise to power in Germany during the 1860s was no fluke of nature. He was born to a wealthy and well-educated Prussian family as a conservative Junker, or young nobleman. After orchestrating successful short wars against Austria, Denmark and France that helped to unify the German states, he was catapulted to the position of Chancellor. As a staunch conservative, he was often called the 'Iron Chancellor', but was better known as Otto von Bismarck (see Figure 3).

His mastery of complex politics at home is what brought him to fame in the insurance world. Under fierce competition from the Socialists in Germany, Bismarck decided to quell the uprising by proposing workers' rights legislation. In 1883 and 1884, Bismarck enacted Accident & Sickness Insurance for workers. During a speech in 1884, he declared:

"The real grievance of the worker is the insecurity of his existence; he is not sure that he will always have work, he is not sure that he will always be healthy, and he foresees that he will one day be old and unfit to work. If he falls into poverty, even if only through a prolonged illness, he is then completely helpless, left to his own devices, and society does not currently recognise any real obligation towards him beyond the usual help for the poor, even if he has been working all the time ever so faithfully and diligently. The usual help for the poor, however, leaves a lot to be desired, especially in large cities, where it is very much worse than in the country."⁵

The legislation was funded by contributions from the employer and employee, similar to the programmes that exist today in many countries. It was not until 1889 when his real claim to fame was enacted—Old Age & Disability Insurance. Unlike the earlier programmes, governmental funding was added to employer and employee contributions. All workers were covered and the old age portion began to receive benefits at age 70 unless a disability was contracted prior to that age.

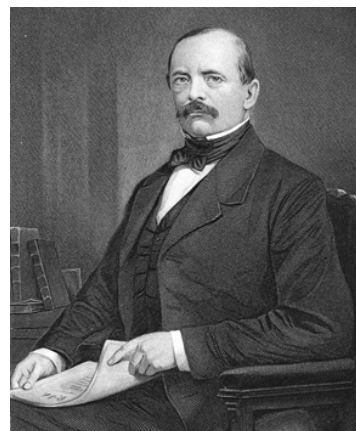
Many papers correctly state that the life expectancy

in Germany at that time was approximately 40 years. However, collecting benefits from the first old age pension was not as rare as one might think. The relatively short average life expectancy in Germany, and in many countries at that time, was mainly due to high infant mortality. Life expectancy at age 50 was approximately 20 years at that time. In fact, life expectancy at 65 was still about 12 years. So, the programme did provide some value to older workers and won Otto von Bismarck support in favour of the Socialist Party, which did not have as bold a plan.

This pension plan is credited as being the basis for many modern day plans. France followed with similar programmes in the mid-to-late 1890s, and the U.K. followed in 1908. It wasn't until the 1920s that the U.S. instituted a similar plan for a small segment of the workforce with the broader plan instituted in 1935. While Bismarck's intentions on the enacted legislation may have been political, the underlying result was to ensure that workers could have some security in older ages when they are no longer able to work.

Otto von Bismarck's Old Age & Disability Insurance seems to be a combination of what many countries refer to as Pillar I and Pillar II retirement plans or what other countries refer to as two legs of the three-legged stool of retirement (since it needed to cover everything except private savings).

Figure 3: **Otto von Bismarck in 1873** *World, 1950–2050*



⁵ Clark: P. The Rich History of Worker's Compensation Business Insurance Quotes

Pension gap defined

Otto von Bismarck never could have imagined that his idea to fend off the Socialists would have grown into worldwide programmes with vastly expanded benefits during the next century. Retirement programmes, both government- and employer-based, enjoyed times of high contributions and low benefit payouts for many years when the programmes began. These times have come to an end with lowering birth rates and increased life expectancies. It should be noted that Bismarck's idea of using 70 as the normal retirement age quickly evolved down to age 65 in the mid-1900s and even today, many people consider age 65 as the normal retirement age. Governments and employers were slow to keep up with increases in life expectancy, continuing to target 65 or younger as the age of 'normal' retirement. It is interesting to note that the 'normal' retirement age and the 'actual' retirement age are approximately equal in the member countries of the Organisation for Economic Co-operation and Development (OECD), however the results vary by country⁶.

In Germany, for example, the life expectancy for males at age 60 increased from 12.2 years in 1960 to 18.2 years in 2014⁷. However, this increase of six years did not translate into a delay in normal retirement age of a like amount.

Box2

The 'pension gap' is defined as the difference between the present value of the yearly lifetime income needed to sustain a reasonable standard of living, and the actual amount that is saved for retirement plus the present value of pay-as-you-go (PAYG) contributions. The present value is over a 40-year period.

While the term 'reasonable standard of living' can be debated, many have simply equated this to a percentage of final salary before retirement⁸ — somewhere between 50–70 per cent is what is mostly utilised in the calculations for defined benefit plans.

Research by the Aegon Center for Longevity and Retirement in 15 countries across Europe, Asia, the Americas, and Australia reveals that workers expect to need 69 per cent of their gross annual income in retirement. Please note that Aegon is using income instead of salary and, while typically used interchangeably, these two figures can be quite different for certain segments of the population. In this paper, we will consider the terms to be interchangeable for the average pensioner.

The Wall Street Journal suggests that 80 per cent of the final salary is too high, since the retiree will no longer contribute to a Pillar I or Pillar II pension and will most likely fall in a lower income tax bracket⁹. Richard Marin of Cornell University suggests that retirees generally require about 60 per cent of pre-retirement salary to be comfortable¹.

Obviously it depends upon the individual, so generalisations can be dangerous. For example, one might argue that a large company CEO earning 10 million euros per year does not need 5–7 million euros of annual retirement income to assure a reasonable standard of living. Also, someone earning a minimum wage in the U.S. of USD 7.25 per hour for a 40-hour workweek grosses less than USD 15,000 per year. It would be hard to argue that USD 7,500–10,000 per year would provide a reasonable standard of living in the U.S. And, of course, there are those who are earning less than this in many countries. Finally, it is difficult to estimate personal assets, especially since this can increase or decrease in value prior to retirement.

For the reasons stated above, it is not the intent of this paper to attempt to calculate the current worldwide pension gap from the ground up. Instead, the paper will point to estimates previously calculated as a starting point to synthesise our definition of the pension gap and project certain scenarios. One may argue as to the factors that go into any calculation, however, no one will dispute the fact that the worldwide pension gap is huge and a serious problem that affects a disproportionately large number of people. That is why we refer to this issue as the 'pension gap epidemic'.

⁶ OECD estimates derived from the European and national labour force surveys, OECD (2015) Pensions at a Glance 2015: OECD and G20 Indicators, Figures 7.8 and 7.9, http://dx.doi.org/10.1787/pension_glance-2015-en

⁷ OECD (2016), Life Expectancy at 65, indicator. doi: 10.1787/0e9a3f00-en (accessed on 4 October 2016)

⁸ Mansfield, M., personal communication, email, 8 August 2016

⁹ Powell, R. (2016) 'How much retirement income will you need? Maybe less than you think', Wall Street Journal, 18 October.

Pillar I pensions may not be guaranteed

This paper’s definition of the pension gap deducts amounts already saved, which seems reasonable. However, these pension savings accounts could lose value quickly. This applies to governmental pensions, private pensions and personal assets. While it is easy to see how private assets can lose value, especially for those who have struggled through the recent worldwide economic crisis beginning in 2008 and saw home and stock values plummet, social and private pensions were typically thought to be secure, which is not as true as pensioners used to think.

Pillar I — Who could imagine that an entire country in the EU would require a bailout? While there were many high-profile company failures and bailouts during the recent financial crisis beginning with Lehman Brothers in 2008, bank failures and high unemployment rates put a major strain on entire economies. Greece suffered greatly during the crisis, in part due to its extremely generous social benefits that the government could no longer fund, requiring multiple bailouts from its EU brethren. In order to secure these bailouts, Greece had to agree to harsh austerity measures including reductions in Pillar I pension benefits that the government had already committed to pay to its citizens.


Why wasn’t the issue of unsustainable social pension obligations highlighted earlier? Because social pension obligations are not required to be disclosed as a liability. These obligations are expected to be funded by a pay-as-you-go (PAYG) system that assumes there will be enough workers to fund the current retirees. Paul Samuelson said it best in a 1967 Newsweek article:

“Social Security is squarely based on what has been called the eighth wonder of the world—compound interest. A growing nation is the greatest Ponzi game ever contrived.”

If this Ponzi game (see Figure 4), as Samuelson called it, was discovered in the private sector, it would quickly be condemned by the media, by the public and by the government.

Figure 4: Charles Ponzi

Born	Carlo Pietro Giovanni Guglielmo Tebaldo Ponzi 3 March 1882 Lugo, Emilia-Romagna, Italy
Died	18 January 1949 (aged 66) Rio de Janeiro, Brazil
Nationality	Italian
Known for	Ponzi scheme
Criminal charge	Forgery (Canada), mail fraud (federal), larceny (state)
Criminal penalty	3 years in Canada 1908–1911; 5 years federal (served 3 and half years before facing state charge) 1920–1922; 9 years state 1927–1934; deportation in 1934
Ponzi Scheme	Promised investors 50%-100% return on investment, but actually paid earlier investors with later investor money.



With a combination of a cut in benefits, penalties for early retirement, an increase in early retirement age, an increase in the number of working years to receive a full benefit and a maximum total pension as a percentage of average lifetime salary (not the final five-year salary as previously in place), Greek citizens are receiving much lower benefits than had been promised. While some of these changes only affect future retirees, others affect current pensioners. This reduction in benefits increases the pension gap as defined by this paper.

A recent report developed by Citigroup shows that 20 of the 34 OECD countries have unfunded government promises to their retirees totalling about USD 78 trillion¹⁰. While not based on our definition of the pension gap, this funding gap is huge. Again, this is just for 20 OECD countries, only includes the governmental sector and does not account for amounts already saved nor give credit for PAYG contributions.

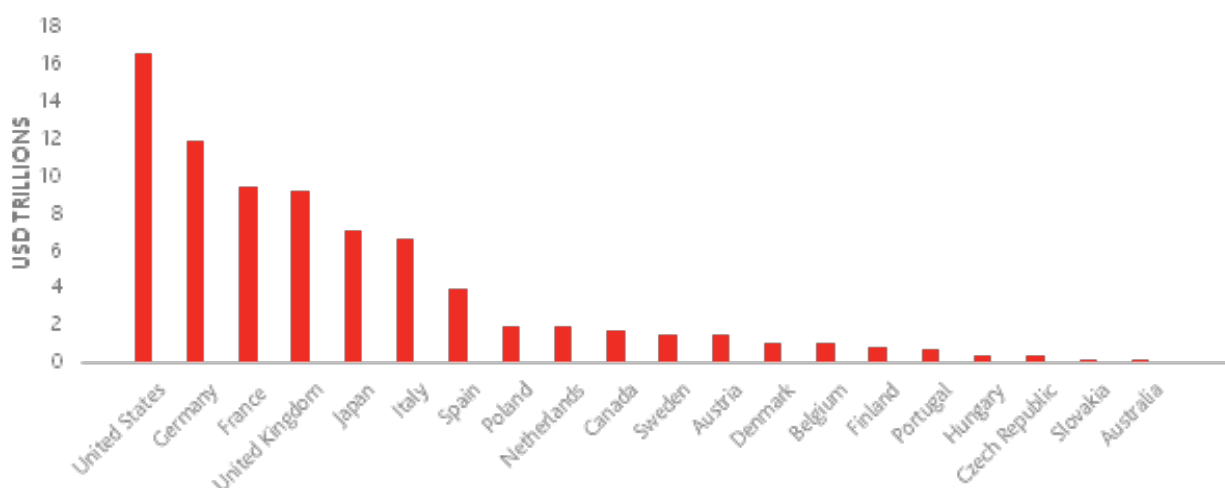
In addition, the USD 78 trillion public pension shortfall is nearly double the amount of the USD 44 trillion debt

that these countries publicly disclose.¹⁰ Countries are fighting fiercely to continue the practice of non-disclosure of pension liabilities, fearing that rating agencies would reduce their sovereign bond ratings leading to higher borrowing costs. The EU has been trying to enact Pillar I disclosure requirements for over 10 years. These requirements were strongly contested by France, Germany, Italy and Portugal, until an agreement was finally reached with the rules scheduled to be set by the end of 2016. The information will be disclosed in a supplementary table of the European System of National and Regional Accounts (ESA)¹¹.

It should be noted that the UN estimates that only 40 per cent of the worldwide population is covered by some type of Pillar I benefits¹². People not covered live in poorer countries, many of which are in Africa.

The burden that this shortfall will cause on future generations may become a major political battle in many countries in future years, pitting the old against the young. To combat these liabilities, many countries have increased

Figure 5: Governmental Pension Funding Gap for 20 OECD Countries.
70% Wage Replacement Ratio and no Deduction for Amounts Already Saved or PAYG Credits.



Source: Citi Global Perspectives & Solutions (2016) *The Coming Pension Crisis*.

¹⁰ Citi (2016) *The Coming Pension Crisis*, Citi Global Perspectives & Solutions. Available at http://www.aviva.com/media/upload/Aviva_Mind_the_Gap_2016_Quantifying_the_pension_savings_gap_in_Europe_HJ9aexB.pdf

¹¹ Williams, J. (2013) Public pension liability disclosure a 'win for transparency' – MEP; Investment & Pensions Europe. Available at <https://www.ipe.com/public-pension-liability-disclosure-a-win-for-transparency-mep/50583.fullarticle>

¹² ILO (2010-2011) *World Social Security Report 2010/11*, Geneva: International Labour Office

the normal retirement age to receive benefits (Table 1). For example, in Poland, legislation passed in 2012 will increase the normal retirement age from 55 for women and 60 for men to age 67 for everyone in 2040. Sixty-seven seems like the age that many countries around the world are targeting as the new normal retirement age, but like

Poland, countries are taking quite a long time to grade into the newly defined normal retirement age. In addition, it can easily be argued that increasing the normal retirement age to 67 will not suffice to close national pension gaps and that further increases in age will become necessary.

Table 1: 'Normal' retirement age for selected countries

COUNTRY	MEN	WOMEN	NOTES
ASIA			
Australia	65	65	Grades to 67 by 2023
China	60	50/55	55 for female civil servants, 50 for other females
Japan	60	60	Employee can defer to 65 and employer is then compelled to comply
Malaysia	60	60	Recently increased age to 60 from 55 with no scheduled further increases
EUROPE			
Belgium	65	65	Grades to 67 by 2030
Denmark	65	65	Grades to 67 by 2022, from 2030 max 1 year increase per 5 years depending upon life expectancy improvements
France	65	65	Grades to 67 by 2023
Germany	65.25	65.25	Grades to 67 by 2023
U.K.	65	62.33	Female grade to male by 2018. Both sexes grade to 68 by 2046
NORTH AMERICA			
U.S.	66	66	Grades to 67 by 2027

Source: Finnish Centre for Pensions ¹³

¹³ Finnish Centre for Pensions (2016)

Contribution rates to PAYG systems have also increased in many countries, and some countries have begun to decrease benefits. For example, in Germany's multilayer Pillar I benefits programme, the first layer of pension benefits has been reduced by about 20 per cent. Some are calling for further cuts while others are leaning to increases in contributions. This led Thomas Schäfer Minister of Finance, German State of Hessen to say:

"...we cannot just stop the reduction of the pension level... Those who are against a further reduction... demand contribution rates higher than 22 percent... This is irresponsible and simply a betrayal of the younger generation which would have to pay with higher contributions for a short postponement of the pension level reduction without benefitting itself."

It is the position of The Geneva Association that a combination of steps must be taken to close the pension gap including public policies that could reach an appropriate balance between benefits and contributions.

In the 2016 survey performed by Aegon which polls about 16,000 people in multiple countries, 31 per cent of respondents believe that governments should increase funding requirements for Pillar I benefits, 15 per cent believe that governments should reduce benefits and 27 per cent believe in some combination of the two⁸. Therefore, nearly three-quarters of the people responding to the survey realise the problem with Pillar I benefits and believe that it should be addressed. This fact should provide some degree of comfort to policymakers when faced with the difficult decisions on how to fill gaps in Pillar I funding.

Another option to reduce the strain on Pillar I pensions could be to require a needs test for social benefit payments. This has probably been debated quite fiercely within the halls of governmental offices, however it will be difficult to pass given the increasing number of people over age 65 in the world. Any such regulation could be introduced with a high earnings cut-off and only apply for new retirees after a certain date.

¹⁴ Pension Rights Center (2012 updated) Companies that are offering lump-sum pension buyouts

¹⁵ Vandeveld, M. (2016) Sir Philip Green's stalled BHS pension plan spared automatic cuts, The Financial Times, 19 May.

Pillar II public pensions may not be guaranteed

Pillar II, public — The above illustrations of reduction in promised pension benefits adds to the complication in calculating the pension gap. If a major U.S. city can declare bankruptcy and not fully pay its promised pension benefits to its city employees and if Pillar I benefits can be cut and contribution rates can rise how can one accurately calculate a pension gap? However, social pensions and pensions to public workers are not the only problem. Private employer pension schemes are under pressure as well.

Pillar II private pensions may not be guaranteed

Pillar II, private — What happens when a large multinational company has a pension deficit of over USD 15 billion? It offers its employees a lump sum 'buyout' to reduce future monthly pension payments obligations. This pension buyout announced by Ford Motor Company in 2012 affected 90,000 employees and was the largest of its kind at that time. While this certainly helped Ford's balance sheet, what happens to its employees? Not all employees affected will purchase an annuity. At least some of the money will be spent for current needs, which immediately increases the pension gap as defined by this paper.

Since Ford's announcement, it is estimated that over 40 companies followed suit and offered pension buyouts to employees, according to Pension Rights Center¹⁴. And this is just in the U.S. Companies outside of the U.S. are also reducing pension liabilities. For example, the recently failed British Home Stores (BHS) will require a government takeover of its pension plan if it cannot find a buyer. This takeover will include a 10 per cent reduction in benefit payments as well as a freeze in inflation protection benefits¹⁵. Even the Netherlands, known for its full pension funding regulations, recently announced that assets in its four largest pension funds have decreased well below the mandatory 105 per cent funding limit¹⁶. This will likely

¹⁶ Dutch News.nl (2016) Pension cuts loom for millions as big funds struggle, 21 April.

translate into a reduction of benefits to its retirees. And, what works in one country, usually finds its way into other countries.

Citigroup estimates that private pension schemes in the OECD countries alone are underfunded in an amount of approximately USD 5 trillion and that the worldwide underfunding level may reach as much as USD 10 trillion¹⁰.

Pillar III savings may decrease

As stated earlier, this paper will not dive deeply into Pillar III or private savings. However, it is safe to say that private savings and assets were severely affected by the recent financial crisis. Also, there is a blurred line between what is now considered corporate pension benefits, in the form of defined contribution schemes and private savings. In some countries where contributions to defined contribution plans are not mandatory and the accumulated funds do not require annuitisation, once the retiree reaches a certain age, he or she may withdraw all of the accumulated benefit in a lump sum to spend as he or she wishes. This is not, in a strict sense, the definition of a pension.

The U.S. government is beginning to realise this and in 2015 passed a regulation (Notice 2015–49 Use of Lump Sum Payments to Replace Lifetime Income Being Received by Retirees under Defined Benefit Pension Plans) limiting lump sum buyouts of defined benefit plans. And, the current administration is looking at ways to automatically enrol workers into defined contribution plans and have, at a minimum, in-plan annuitisation options. However, the U.K. did a 180° turn and repealed its forced annuitisation regulation for defined contribution plans, affording retirees full access to their money. Spending money earmarked for retirement on non-retirement items further exacerbates the pension gap.

The Freedom and Choice in Pensions legislation was passed in April 2015 in the U.K., and the Chancellor of the Exchequer George Osborne, made the following statement in the opening paragraph of the Government Response to the new regulation:

"This government believes in the principle of freedom. Individuals who have worked hard and saved responsibly throughout their adult life should be trusted to make their own decisions with their pension savings, and the reforms I announced at Budget will deliver just that."

But are individuals well equipped to make their own decisions with respect to pension savings and expected life expectancy? Even actuaries struggle with this very issue. John Strangfeld, CEO of Prudential Financial, Inc., remarked at a recent International Insurance Society seminar that:

"We can help fill the retirement protection gap by shifting longevity and investment risks back to insurers. We have the expertise and scale to manage them much more effectively than individuals or even employers."

Mr Strangfeld implies by his comments that current owners of retirement monies in defined contribution plans may have too much risk and not enough expertise to effectively manage this risk.

In addition, Ulrich Wallin, Chairman of the Executive Board of Hannover Rück SE, said at a recent interview on the topic:

"Most people underestimate their life expectancy and are not aware of the fact that they will probably live longer than their own parents or grandparents. On average, men underestimate their own life expectancy by 5 years and women by 8 years. As a consequence, they may take the wrong decision when it comes to securing income in old age"¹⁸

Underestimating life expectancy, as Mr. Wallin suggests, will immediately put pressure back on governments once personal funds are depleted. Even well-planning individuals can easily fall into this trap.

Could the real reason for the passage of this U.K. legislation be the low interest rate environment — causing low annuitisation rates of current pension benefits? Steve Webb, U.K. Minister of State for Pension from 2010–2015, said that the main reasons for enacting this legislation

¹⁷ Waldeck, P., personal communication, email, 23 May 2016.

¹⁸ Glausch, D., personal communication, email, 29 June 2016.

¹⁹ Webb, S. personal communication, email, August 2016.

was because the government did not want to be seen as a 'nanny state' by forcing decisions on its citizens that it felt were best for them and because annuity rates were (and continue to be) unattractive due to the low interest rate environment. He went on to say that there were very few impaired-life annuities (where less healthy people receive a higher monthly payout for the same deposit because they should die sooner) available in the market, which discriminates against those in poor health¹⁹. By enacting this legislation, is the government simply pushing the current problem far enough into the future, so that the current administration will not have to worry about it? While these questions are interesting, not requiring lifetime income from accumulated defined contribution pension monies will increase the future pension gap.

The Geneva Association concept of Pillar IV

Since as far back as 1986, The Geneva Association has been developing the concept of a Fourth Pillar or working past the normal retirement age²⁰. While working past retirement has many obstacles, it will become a vital part of efforts to reduce the pension gap in many countries. With fertility rates on the decline and life expectancies increasing, there will not be enough workers to support retirees in the current retirement model.

In less than 20 years, the last of the baby boomers (generally referring to as those born between 1946 and 1964) will be retiring. Not only will this add substantially to the number of retirees, it will also mark a significant drop to the work force. A combination of these two factors will require some form of Pillar IV solutions. It is interesting that Bismarck's first attempt at a national pension system began with a retirement age of 70. It appears that we may circling back to that age in the near future.

Another option to reduce the strain on Pillar I pensions could be to require a needs test for social benefit payments. This has probably been debated quite fiercely within the halls of governmental offices, however it will be difficult to pass given the increasing number of people over age 65 in the world. Any such regulation could be introduced with a high earnings cut-off and only apply for new retirees after a certain date.

²⁰ Reday-Mulvey, G. (1993) 'Research Programme on Social Security, Insurance, Savings and Employment: the fourth pillar', The Geneva Papers on Risk and Insurance—Issues and Practice 18(68): 302–316.

Magnitude of the pension gap

Increases in normal retirement ages that are occurring too slowly for Pillar I pensions, buyouts and reducing benefits for Pillar II pensions and the continual low interest rate environment for Pillar III savings are all adding to the pension gap. But does the general public perceive the pension gap to be an issue?

It is quite interesting that surveys on this topic have been performed in many countries. And while surveys are not necessarily very reliable, the results around the world are remarkably similar. On all questions to pre- and post-retirees about fears of outliving their retirement savings, about not being able to live the quality of life that they hoped, about not being able to pay medical bills, etc., pre-retirees are much more concerned than current retirees. This could be because current retirees still have defined benefit pension plans to rely on. It could be because pre-retirees have not saved as much as current retirees have. Or, it could be that once a person retires, he or she knows what is unknown to the pre-retiree. And fear of the unknown, in many cases, is worse than the event. It should be noted that in these surveys, current retirees are still concerned with the above issues, however they are just less concerned than pre-retirees.

One such survey is the U.S. Society of Actuaries 2015 Risks and Process of Retirement Survey which was performed by Mathew Greenwald & Associates, Inc. on behalf of the Society of Actuaries. Of major interest are two specific questions.

1. Concerning the question about assumed life expectancy, about 70 per cent of both pre- and post-retirees underestimate this actuarial assumption. Assumed life expectancy is extremely important in retirement planning if the retiree does not have guaranteed lifetime income such as a defined benefit pension or an annuity.
2. Concerning the question about owning an annuity or planning to purchase an annuity, more than two-thirds of the pre-retirees have not yet purchased an annuity or do not plan to choose a lifetime guaranteed option from their employer's pension plan. For post-retirees, this number increases to nearly 80 per cent.

The combination of these elements of the survey are daunting and further show that the average citizen is either not willing to or is not informed enough to plan for his or her retirement adequately.

For the EU, Aviva estimates the net annual pension gap to be approximately EUR 1.9 trillion²¹. More importantly, this amounted to about 19 per cent of the EU's GDP at the time! Using an annuity factor of 21 (German annuity mortality table from age 65 at 4 per cent) as the present value of the number of years workers live after retirement yields a total pension gap for the EU of about EUR 40 trillion before deducting for PAYG contributions. And this is for the EU alone. One could easily dispute the assumptions used in the calculation such as a 70 per cent pre-retirement replacement ratio and 4 per cent return on pension investments or the annuity factor of 21. However, regardless of the assumptions used, the pension gap for the EU is huge.

Richard Marin estimates the global pension gap at USD 100 trillion in his book called *Global Pension Crisis—Unfunded*

*Liabilities and How Can We Fill the Gap*¹. Marin uses a relatively simplistic but effective method of calculating this gap using GDP and old-age dependency ratios to project the amounts needed for retirement and then deducts an estimate of monies saved in pension funds. Again, one can argue about some of the assumptions used, such as a 5 per cent discount rate, a 60 per cent replacement ratio or the mortality tables, but no one can argue the magnitude of the problem. Again, Marin does not deduct PAYG contributions. His estimate, at the time, was approximately 140 per cent of GDP worldwide. By not deducting for PAYG, Marin highlights the amount of money that would have to be saved per year to pay for this gap. While PAYG will make a large impact, it will not fill the entire gap.

It should be noted that Marin's calculations closely align with those of Aviva and Citigroup. Using Marin's calculation, the pension gap for the EU would be approximately USD 36 trillion, which is quite close to the estimate of EUR 40 (USD 45) trillion derived from Aviva's annual reported gap of EUR 1.9 trillion. Aviva uses a 70 per

Table 2: Pension gap for top five countries

(Marin method, before and after PAYG adjustment)

Country	Pension gap USD trillions before deducting for PAYG	Pension gap USD trillions after deducting for PAYG	Pension gap after PAYG as % GDP
China	14.3	5.3	51%
Japan	13.5	9.7	210%
Germany	12.3	9.0	234%
U.S.	8.5	0	0%
France	8.0	5.6	198%
World	100.0	41.0	83% average

Source: *The Geneva Association research.*

²¹ Aviva plc (2010) *Mind the Gap, Quantifying Europe's Pension Gap*. Available at http://www.aviva.com/media/upload/Aviva_Mind_the_Gap_2016_Quantifying_the_pension_savings_gap_in_Europe_HJ9aexB.pdf

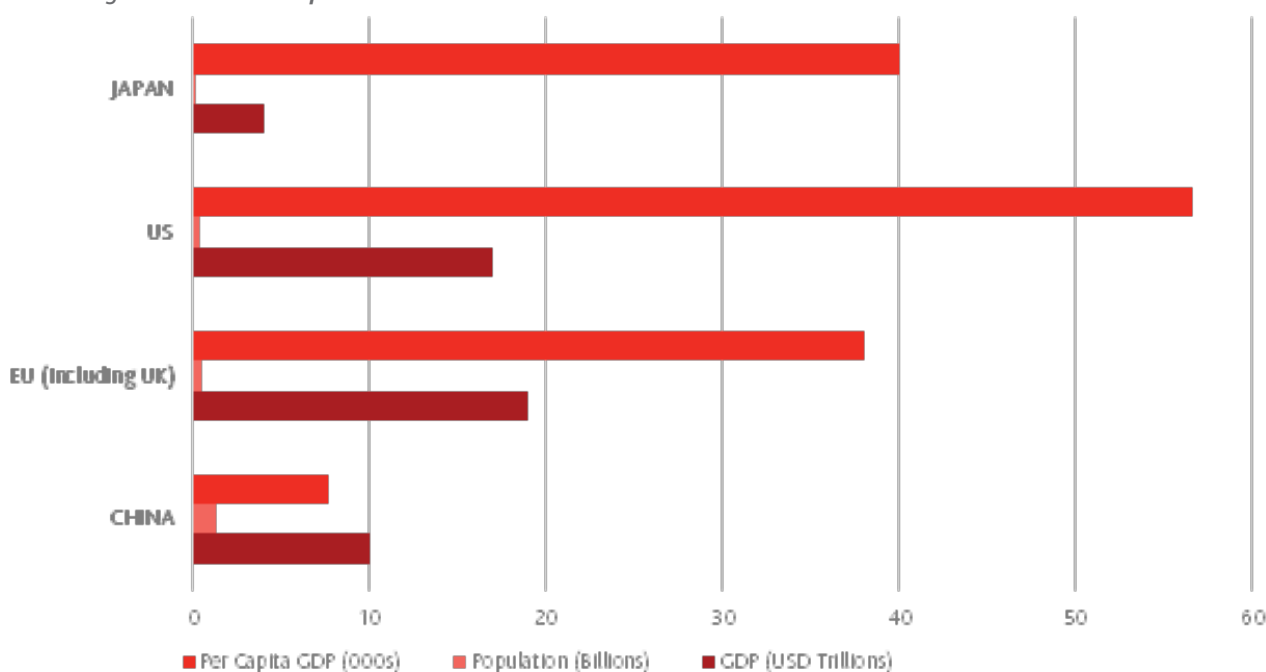
cent wage replacement ratio and Marin uses only 60 per cent. After this adjustment, Aviva's calculation drops to USD 39 trillion. The remainder could easily be explained by the difference in the discount rate (Aviva 4 per cent, Marin 5 per cent).

Citigroup focuses more on gaps to fund existing government plans whereas Marin attempts to calculate the pension gap as we define in this paper before taking into account PAYG systems. According to Marin's method, the 20 OECD countries that the Citigroup study focuses on would yield a pension gap of USD 62 trillion. Citigroup only includes governmental pensions (including government employees) and does not deduct for amounts already saved. Deducting an estimated USD 22 trillion for amounts saved and adding USD 5 trillion (Citigroup's estimate of the Pillar II shortfall) would produce a pension gap of USD 61 trillion. The USD 22 trillion in savings is an estimate of the amounts currently in retirement savings accounts using the calculation methodology in Marin's book for these countries.

Even though the methods and assumptions differ, the calculations do reconcile nicely. Then, once we deduct for the present value of future PAYG contributions, we arrive at The Geneva Association's definition of the pension gap (Table 2). It should be noted that the U.S. does not fall into the Top 4 list, below, even though it has a very large gap, according to Marin's methodology, of USD 8.5 trillion. The reason is that the very high GDP in the U.S. makes its PAYG contribution rate for Pillar I benefits high enough to negate the gap according to Marin's book. Of course, the U.S. has its own problems with an estimate of between USD 10 and USD 15 trillion of projected shortfall if it wants to pay the current rate of benefits for the next 40 years. Without a change in the law, benefits will have to be slashed by about 25 per cent to meet this gap.

Asia has no less of a pension gap issue than Europe and North America. In fact, some may argue that the situation is even more dire. The one-child policy in China has caused this populous country to have fertility rates below 2 since the mid-1990s. This, in conjunction with improving

Figure 6: GDP Per Capita in USD Thousands.



Source: World Bank national accounts data, and OECD National Accounts data files.

²² OECD (2011) Society at a Glance 2011: OECD Social Indicators, OECD Publishing.
http://dx.doi.org/10.1787/soc_glance-2011-en

²³ Pew Research Center (2014) Attitudes about Aging: a Global Perspective.

mortality, will cause the ratio of workers to people over age 65 to decrease from about 7.9 in 2008 to about 2.4 by 2050, according to OECD estimates²². Europe is expected to have a similar ratio in 2050, but it is beginning at a much lower ratio of about 4.2 in 2010 according to the Pew Research Center.²³ Europe will continue to feel the pain but at a slower rate of decline than China. And, the EU is much wealthier than China as measured by GDP per capita, as shown in Figure 6. It is true that the Chinese economy has experienced a sharp rise in the past decade, but it still lags far behind other economies. According to the World Bank, the GDP per capita for China is about USD 7,500 while the respective numbers for the EU and the U.S. are USD 36,000 and USD 55,000.

In addition, the one-child policy caused a cultural shift in Asia away from parents relying on their children for support. This 'family model' is not sustainable in China any longer. According to Richard Jackson of the Global Aging Institute (GAI):

*"The overwhelming majority of Chinese believe that government, rather than the family or the individual, should be the ultimate guarantor of retirement security"*²⁴

Another reason for the bleak outlook in China has to do

with the Iron Rice Bowl policy. The Iron Rice Bowl was a policy that basically guaranteed state workers (including military and state-owned enterprises) a stable living standard regardless of performance. It began when Mao Zedong brought all Chinese workers under state control in 1949²⁵. These workers received governmental benefits of about 75 per cent of pre-retirement income and, according to a survey by the GAI, scored highest among retirees in neighbouring countries as to feeling secure during retirement years. Unfortunately, benefits have been dramatically cut for future retirees. This will obviously make it more difficult for future retirees to maintain a reasonable standard of living, but it will also create some intergenerational friction as the Iron Rice Bowl cohort of retirees continues to receive superior benefits.

Whereas China has moved away from the family model, Japan may need to rely upon it more heavily again. Like China, Japan has moved away from the family model, but less so than China. According to The Geneva Association's calculation²⁶, Japan has the highest current pension gap in the world. This is due to Japan 'enjoying' the second longest life expectancy in the world (Monaco is first), according to the World Factbook²⁷, coupled with one of the lowest fertility rates in the world (211th of 224 according to the World Factbook²⁸).

Table 3: Pension gap by component
(Countries with largest pension gaps)

Country (alphabetical order)	GDP per capita (USD 000s) R<30; 30<Y<40; G>40	Old-age support ratio Current< 5 and 2050< 3; one criteria; neither criteria	Savings as % GDP R<60%; 60%<Y<100%; G>100%
China			
France			
Germany			
Japan			

Note: Red implies danger, yellow implies impending danger and green implies safety

²⁴ Jackson, R. personal communication, email, 4 May 2016

²⁵ BBC Online Network (nd) China's Communist Revolution — A Glossary. Available at http://news.bbc.co.uk/1/hi/english/static/special_report/1999/09/99/china_50/

²⁶ The Geneva Association calculation

²⁷ The World Factbook Country Comparison: Life Expectancy at Birth. Central Intelligence Agency

²⁸ The World Factbook Country Comparison: Total Fertility Rate. Central Intelligence Agency

²⁹ Fukawa, T. (2001) Japanese Welfare State Reforms in the 1990s and Beyond Quarterly Journal of Economic Research 70(4): 571-585

The Japanese government saw this evolution in demographics coming and instituted cuts to retirement benefits and increases to normal retirement ages in the late 1990s.²⁹ Then, in 2004, an automatic pension stabiliser was enacted that annually recalibrates benefits according to the number of workers in the workforce and life expectancy development. It is too early to tell if these measures will be socially sustainable, as benefits may need to be reduced during the next 20 years. Finally, China and Japan have been slow to increase normal retirement age to the levels that we are seeing in European countries, which puts extra pressure on the pension gap.

Demographics

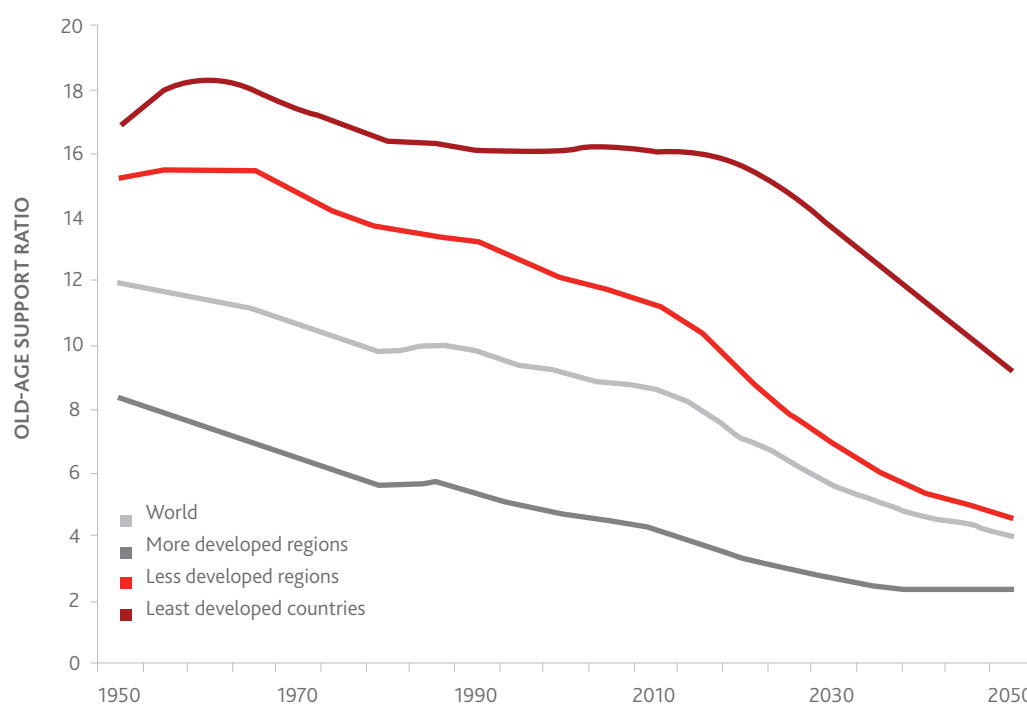
Old age support ratio

Demographics plays a role in two major components of the current pension gap—low fertility rates and increased life expectancies. These trends are projected to continue into the foreseeable future. In its paper entitled *World Population Ageing 2013*, the United Nations projects that

the number of working-age people (ages 15–64) divided by the number of retirees (ages 65 and over) will drop to approximately 3.7 in 2050 from 12 in 1950 and 6.9 currently, worldwide.²⁷ As devastating as this sounds, it is even worse for the UN's category of 'more developed nations'. In 1950, this old-age support ratio was about 8. It is currently approximately 3 and is projected to further decline to 2 by 2050.

Although many countries are already increasing the age at which workers can begin to withdraw governmental pension benefits, estimates of the old-age support ratio maintain the same ages in the calculation. It has already been stated that the worldwide ratio is projected to drop to about 3.7 in 2050 from a current ratio of 6.9. However, if we add the world population of people ages 65–69 to the working ages and subtract them from the retired ages, the 2050 projected ratio increases to approximately 5.6. This adaptation has a dramatic impact on the pension gap. Adding ages 65–69 to the working population assumes that there are enough jobs to accommodate this age group, that they are healthy enough to work full time, that

Figure 7: Old-age Support Ratio: World and Development Regions, 1950–2050.



Source: United Nations, Department of Economic and Social Affairs, Population Division (2013). *World Population Ageing 2013*. ST/ESA/SER.A/348.

Note: The old-age support ratio is the number of working-age persons (age 15–64 years) per older person (aged 65 years or over).

they want to work full time, that their job status will not decrease the number of jobs available for all other working age groups, that they will earn the same amount as they did prior to becoming age 65 and that the group would continue to fully fund Pillars I, II and III pensions.

Although many countries are already increasing the age at which workers can begin to withdraw governmental pension benefits, estimates of the old-age support ratio maintain the same ages in the calculation. It has already been stated that the worldwide ratio is projected to drop to about 3.7 in 2050 from a current ratio of 6.9. However, if we add the world population of people ages 65–69 to the working ages and subtract them from the retired ages, the 2050 projected ratio increases to approximately 5.6. This adaptation has a dramatic impact on the pension gap. Adding ages 65–69 to the working population assumes that there are enough jobs to accommodate this age group, that they are healthy enough to work full time, that they want to work full time, that their job status will not decrease the number of jobs available for all other working age groups, that they will earn the same amount as they did prior to becoming age 65 and that the group would continue to fully fund Pillars I, II and III pensions.

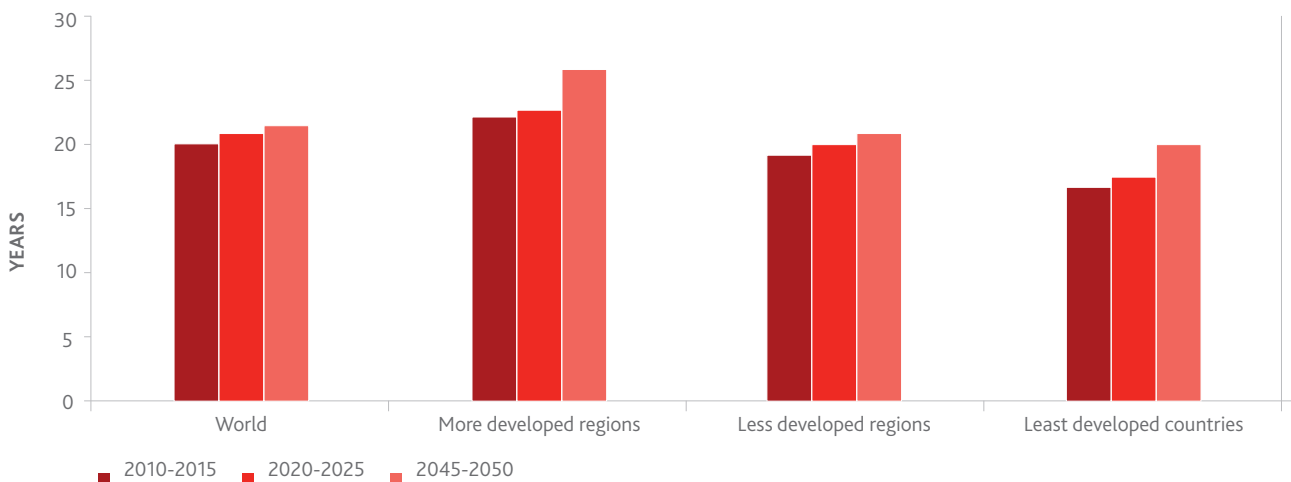
If all these assumptions hold true, the net effect on the pension gap is to reduce it worldwide to about USD 10 trillion. Of course, this would also imply a large increase in GDP generated by these workers.

It is important that we do not over-emphasise the level of the pension problem, otherwise we risk not realising the value of some of the solutions that will be proposed later in the paper. It is clear that the old-age support ratio is dropping to dangerously low levels worldwide. Further increases in the age of retirement will clearly mitigate this issue.

Life expectancy and fertility rates

But, without a slowing of life expectancy gains or an increasing of fertility rates in countries with currently very low rates, the pension gap will continue to worsen. The UN projects that for people currently aged 60, life expectancy worldwide is expected to increase by two full years by 2050 from 20 years to 22 years. For more developed nations, the increase is from 23 to 26 years by 2050, as Figure 8 illustrates. These projections do not take into account any major 'shocks' to mortality such as a cure for cancer or a pandemic flu, the effects of which are discussed later in this paper.

Figure 8: Life Expectancy at age 60: World and Development Regions, 2010–2015, 2020–2025 and 2045–2050



Source: United Nations, Department of Economic and Social Affairs, Population Division (2013). World Population Ageing 2013. ST/ESA/SER.A/348

The decline in fertility rates is probably more surprising than the increase in life expectancy. The fertility rate is defined as the number of children that a woman has during her childbearing years. While it would seem logical that a fertility rate of 2.0 would be sufficient to replace the woman and the father, due to infant mortality, women not living through their childbearing years and imbalances between male/female percentages in some countries, the average worldwide fertility rate needed to replace the current population is approximately 2.1.

Between 1965 and 2014, the worldwide fertility rate has dropped from 5.1 to about 2.5. In Europe, this trend is even more dramatic with a current rate of about 1.5. It is interesting to note that the EU is becoming more homogeneous with respect to fertility rates, as there was as much as a 2-point difference between current EU member states in 1970 (3.8 for Ireland and 1.8 for Iceland), whereas the largest disparity today is only 0.8 (2.0 for France and 1.2 for Portugal).³⁰

While some experts may have seen that a drop in fertility rates was inevitable, the continued drop in fertility rates, and to a level below the replacement rate of 2.1, was not forecasted until relatively recently. Why is this and what is causing this phenomenon? And what can be done about it?

Low fertility rates are caused by many factors:

- **Urbanisation** — the highest fertility rates have traditionally occurred in less developed countries that are largely rural. Child labour is used in the fields in these regions encouraging families to have more children. In 1950, the UN estimated that 30 per cent of the world population lived in urban areas. Today it is more than 50 per cent, and the UN projects that by 2050 the percentage of people living in urban areas will approach 66 per cent. In Europe and North America, the percentage is higher with current urban population of about 73 per cent and 82 per cent, respectively. People living in urban areas also have fewer children simply because it costs more to raise a child in urban areas than in rural areas.

³⁰ http://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Fertility_statistics&oldid=282879 Categories: Fertility and births Population Statistical article Yearbook

- **Education of women** — better educated women traditionally have fewer children or have them later in life, and women are becoming more educated worldwide. Also, educated women are entering and remaining in the workforce contributing to lower fertility rates. However, more recent data has shown some positive correlation between working women and fertility rates in countries where better benefits to working families are available (longer paid maternity and paternity leave, on-site childcare, work-from-home options, etc.).
- **Lower infant mortality rates** — especially in less developed nations, families had more children because of high infant mortality rates. With lowering infant mortality, families are choosing to have fewer children.
- **Social pension access** — in many countries, families had children to take care of their parents when they aged; this is the so-called family model. With the proliferation of social pensions, this model is less utilised today.
- **Birth control and abortion** — the legalisation and availability of abortion and birth control reduces the fertility rate worldwide.

There is another view on fertility rates that is not so daunting, however. In a paper entitled *The Coming Baby Boom in Developed Economies*, BCA Research, using data from the Max Planck Institute, indicates that fertility rates are being severely underestimated due to the manner in which the fertility rate is calculated³¹. The fertility rate is calculated based on a theoretical woman having children in exactly the same numbers as a snapshot of women currently aged 15–44 today.

Therefore, if women are having children at older ages, as BCA Research shows (Figure 9), assuming that a 30-year-old woman will have the same number of children when she is 40 as a woman who is currently 40 may be incorrect. This is further amplified by the fact that many families are delaying having children until after the lingering financial

³¹ BCA (2016) *The Coming Baby Boom in Developed Economies*, BCA Research. Available at <http://blog.bcaresearch.com/wp-content/uploads/2013/10/The-Coming-Baby-Boom-In-Developed-Economies.pdf>

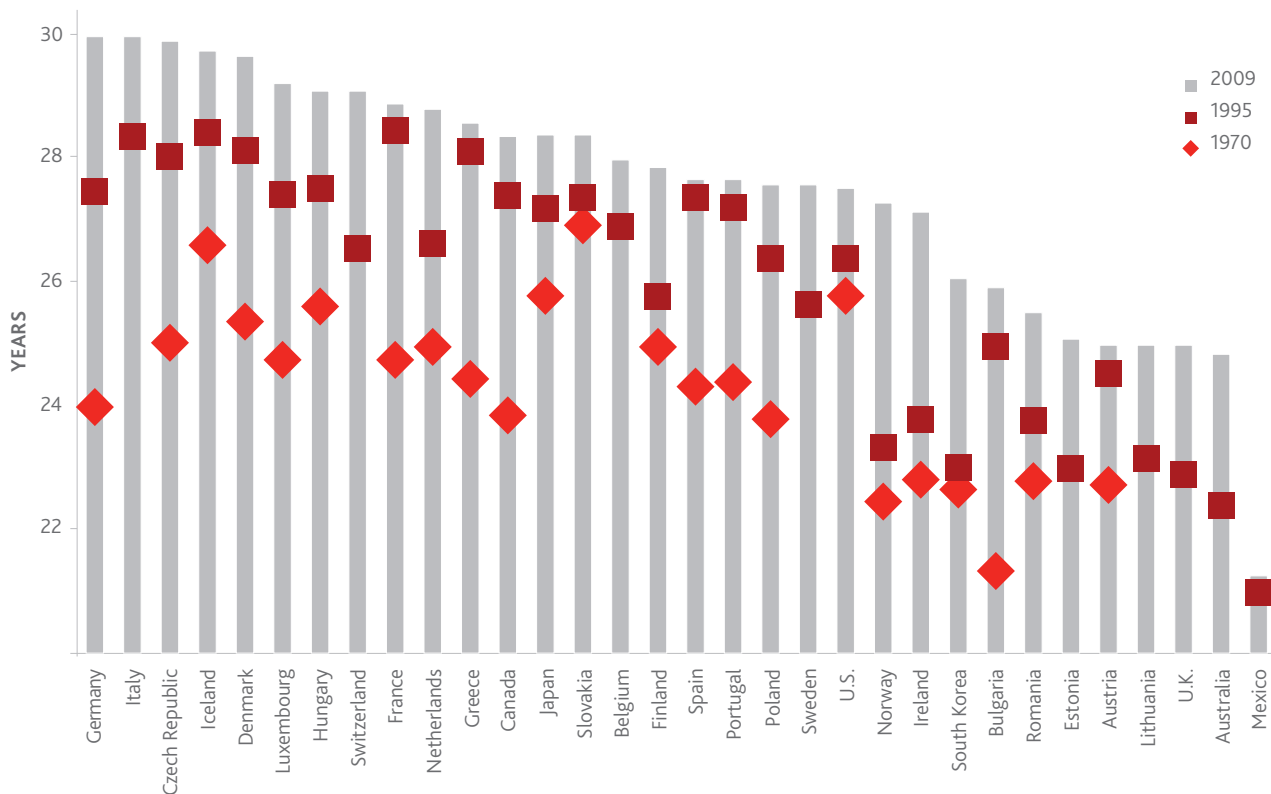
crisis. In fact, BCA Research states that this pending baby boom may be larger than the one that occurred in the 1950s–1960s. Another piece to the puzzle is that studies have shown that wealthier families are the ones having more children.³² This is consistent with some of the reasons stated above for low fertility rates—that it is expensive to have children and that urbanisation lowers the need to have children. BCA shows the recent trend of a positive correlation between income and child birth in many countries (see Figure 10). If BCA is correct, a coming baby boom will have a strong mitigating effect on the global pension gap epidemic, albeit when these babies enter the workforce in 20–30 years. Please note that while this is an interesting theory and important enough to raise in our

paper, BCA's view is not widely agreed to within much of the academic world.

While this paper continues to focus on increased life expectancy and lower fertility rates as the main drivers of the pension gap, the issue is simply that people are not saving enough for retirement. If people would start saving at younger ages, save more and continue to save, there would be much less of a pension gap. However, it is difficult to determine how much to save when lifespans continue to increase and when there are less children born to support this increasing number of retirees in PAYG systems.

The ageing of the population has been well documented

Figure 9: Average Age of First Childbirth



Source: BCA (2016) *The Coming Baby Boom in Developed Economies*, BCA Research

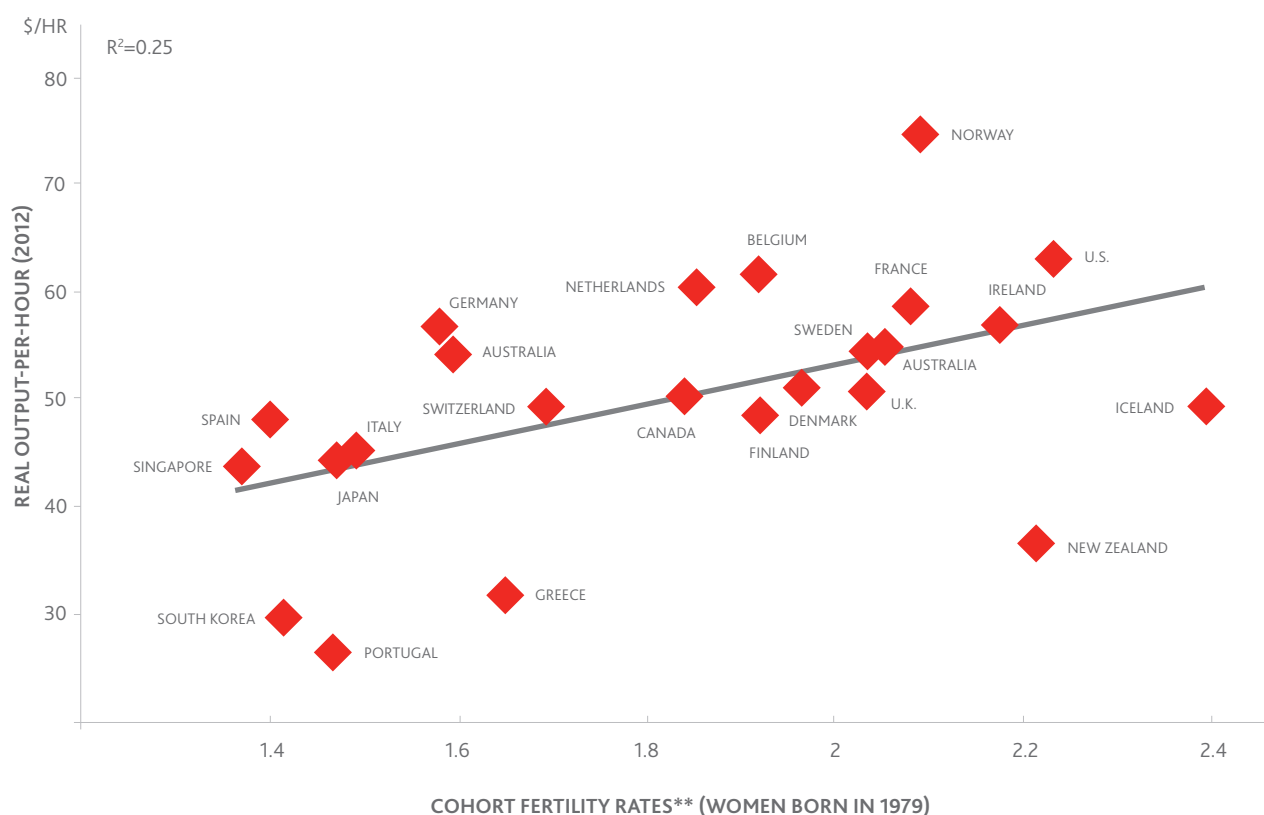
³² The Guardian (2014) High-fliers have more babies, according to study, 25 October

and discussed in this paper. One of the consequences of the ageing of society has not been widely discussed. As the percentage of people above age 65 continues to grow, there will be more pressure on governments in democratic nations to maintain benefits to retirees if not increase them. Politicians will struggle to enact legislation that will negatively impact social pensions or be quickly removed from office. Therefore, the onus of the governmental portion of the pension gap will fall upon younger people. With fertility rates at historically low levels, there will be fewer and fewer numbers of workers to spread this burden upon.

With current and well publicised migration of people from war-torn nations in the Middle East to Europe, the EU is struggling with what to do with these millions of immigrants. Some early issues with assimilation such as the

riots near the Cologne train station in Germany, have taken the headlines and caused anti-immigration movements in many countries around the world. However, besides the obvious humanitarian benefits, could allowing these mostly young immigrants into the EU actually mitigate the pension gap? Assuming that these immigrants will assimilate to their new home country in a reasonably short period of time, these immigrants will need food, shelter and clothing. Therefore, they will need to work. And since the overwhelming majority of immigrants are relatively young, this influx of people could actually help to slow the declining old-age dependency ratio in Europe. In addition, it is likely that these immigrants will have fertility rates more akin to the rates in their home countries which are generally higher than that of the rates in their new home country. This may also help to mitigate the pension gap.

Figure 10: Relationship of Income to Fertility Rates



Source: The Conference Board Total Economy Database, January 2013. Mikko Myrskylä, Joshua R. Goldstein, and Yen-Hsin Alice Cheng, 'New Cohort Fertility Forecasts for the Developed World: Rises, Falls, and Reversals', *Population and Development Review* 39(1): PP. 31-56 (March 2013).

Additional risk factors to consider

The figure below summarises the risks society is currently facing.

Low Interest Rates

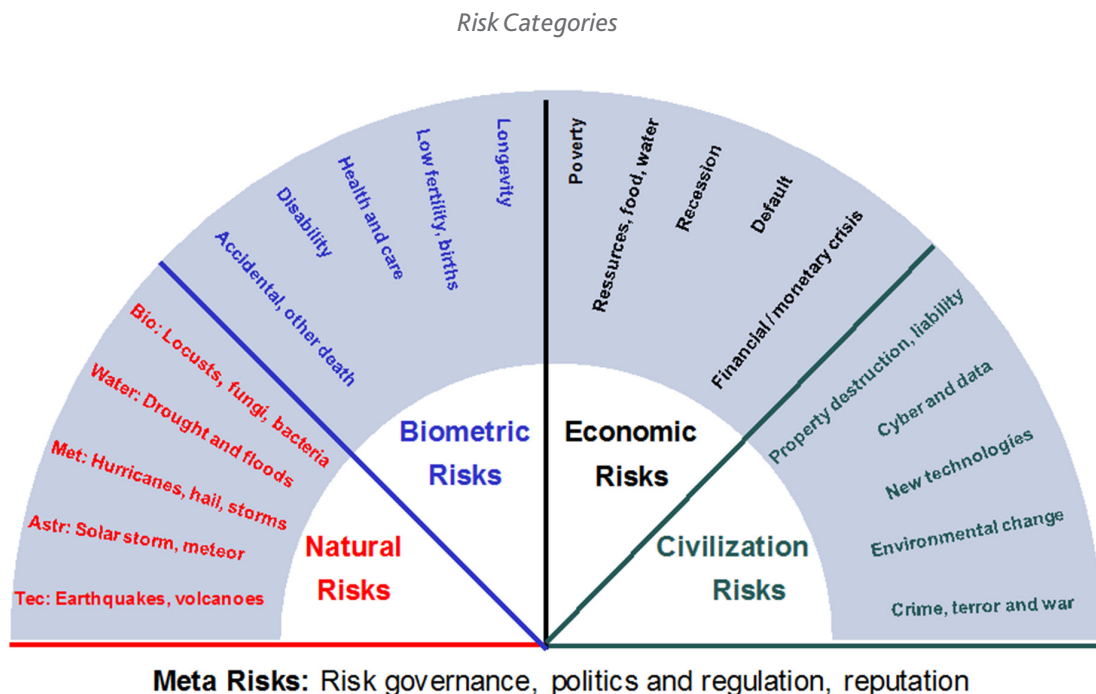
A paper cannot be written about pensions in the current economic environment without highlighting the ongoing low interest rate environment. This is akin to the Japanese scenario where interest rates are currently negative and have been below 1 per cent since the mid-1990s. The low interest rate environment may have some positive effects on economies such as low mortgage rates for homes and low business loan rates, but it is devastating to the average person trying to save for retirement. Not only are savings accounts affected, but deposits into Pillar I and Pillar II pensions will have to be increased in order to maintain a

level of future retirement income previously expected.

Insurance companies and pension funds that hold a large portion of pension and annuity assets are also seriously affected. Many insurance companies issued life and annuity policies with minimum guarantees of 3 or 4 percent returns on asset value at times where the economic conditions could easily handle these guarantees. Companies need to earn a spread on the rates credited to their policyholders in order to be able to pay expenses and earn a profit. When the insurers are earning less than what they are crediting to their policyholders, companies make losses on these products.

Blackrock's CEO Laurence Fink said at a recent conference in Singapore:

Figure 11: Types of risk society is facing



Source: Allianz SE

© V. Deville, Allianz Deutschland AG

Risk management in global business, Uni Bayreuth, Jan 2016

*"The overwhelming majority of Chinese believe that government, rather than the family or the individual, should be the ultimate guarantor of retirement security"*³³

It should be noted that Blackrock is currently the world's largest asset manager and the largest investor in insurance companies.

Warren Buffet, CEO of Berkshire Hathaway, wrote in his Chairman's letter in the 2015 annual report:

*"The prolonged period of low interest rates the world is now dealing with also virtually guarantees that earnings on float will steadily decrease for many years to come, thereby exacerbating the profit problems of insurers. It's a good bet that industry results over the next ten years will fall short of those recorded in the past decade, particularly for those companies that specialise in reinsurance"*³⁴

Berkshire Hathaway owns Gen Re, GEICO, National Indemnity, Berkshire Re and other insurers.

It is no different for defined benefit pension plans. When actuaries calculate the required monies to be set aside to ensure that future pensions are properly funded, they assume a certain rate of return on assets. When the assets earn less than the original assumptions, companies will be required to pay more to fund these pensions. This is putting a terrible strain on many companies and causing them to reduce benefits (when possible), sell pension businesses to third parties or even declare bankruptcy. At the very least, low interest rates increase the pension gap and will continue to do so until they return to more historical levels. For example, Mercer reported in a recent study that the 30 companies comprising the DAX (German stock index) had funding ratios of about 60 per cent (assets divided by liabilities) for employee pensions. These ratios are continually dropping due to the low interest rate environment.³⁵

In addition, the value of pension liabilities increases as the discount rate used is lowered. Pension liabilities are simply the present value of future promised payments, and a

low discount rate causes an increase in the present value calculation. This 'double whammy' of higher liabilities and lower investment earnings is going to be tough for governments and companies to battle in the coming years.

Biometric Risks

Another important factor to consider is biometric risk. A major pandemic flu such as the 1918–1919 Spanish flu that killed an estimated 50 million people worldwide, according to the Centers for Disease Control and Prevention (CDC) in the U.S., could have a major effect on the pension gap. In fact, the CDC reports that the number of deaths could have been severely understated and may have been as high as 100 million—and this at a time when the worldwide population was only 1.8 billion.³⁶ Does this mean that a similar breakout of the virus today could cause 200 million deaths or even 400 million?

An interesting component of the Spanish flu was that the typical 'U-shaped' mortality curve of a flu epidemic was significantly altered to look more like a 'W-shaped' curve (Figure 12). The U-shape of the mortality curve refers to increased mortality for the very young and very old. It makes sense that a severe flu pandemic would have the potential to kill people that are more vulnerable but would only sicken those with a stronger immune system, typically middle-agers.

The W-shape to the Spanish flu mortality curve means that this virus killed people in their 20s, 30s and 40s in addition to the very young and very old. There are many reasons that experts have given to explain this phenomenon including the ongoing world war, lower immune systems due to the length of time since the last major flu epidemic, the lack of antibiotics and no worldwide means to communicate and share data. Also, some experts believe that this flu caused immune systems in younger people to actually overreact to the virus causing death.

³³ Keatinge, C. (2015) Fink says central bankers 'destroying' insurers with low rates, Bloomberg, 21 April.

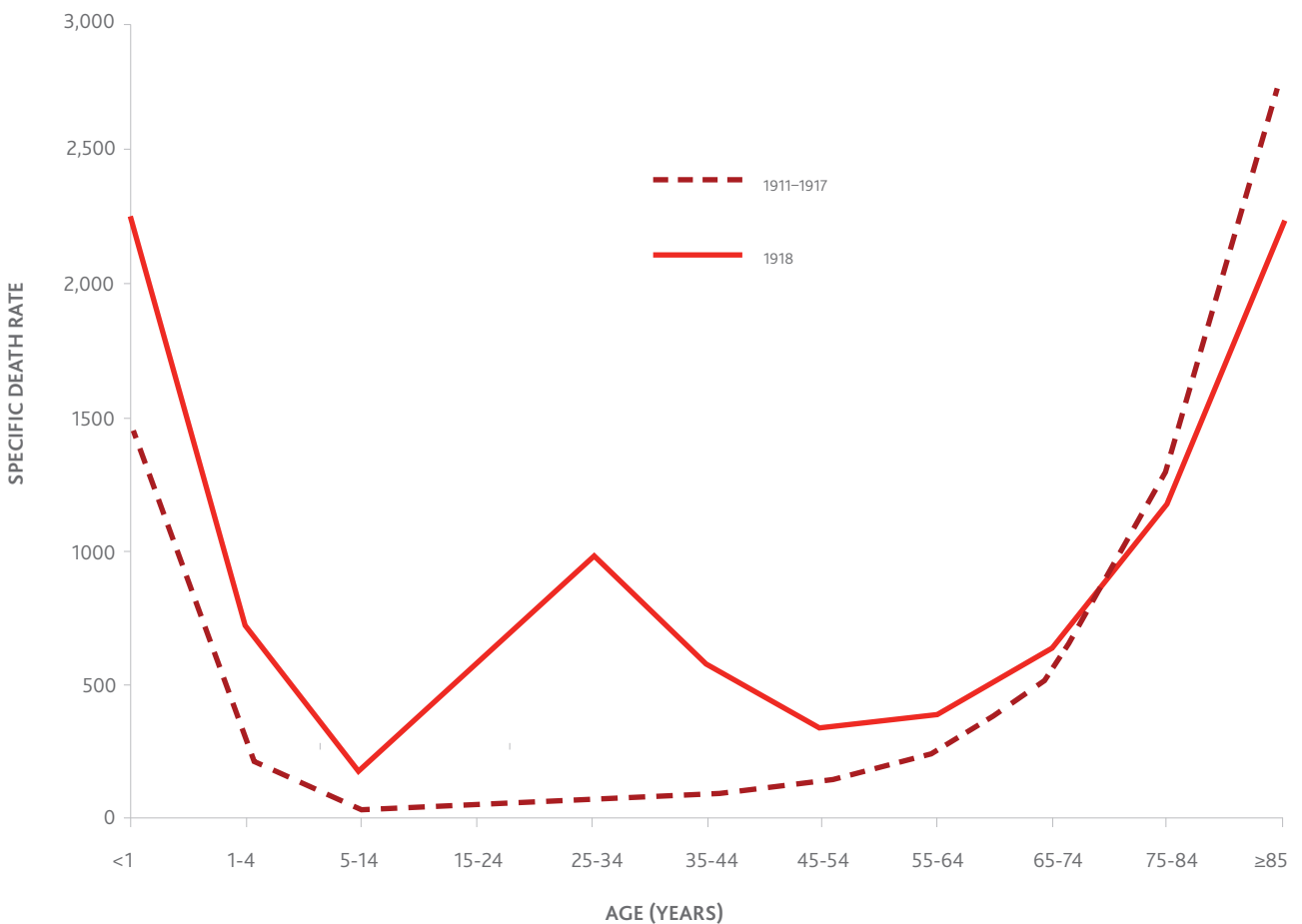
³⁴ Buffet, W. (2016) Berkshire 2015 Shareholder Letter.

³⁵ Reeve, N. (2014) Eurozone pensions count the cost of falling rates, Chief Investment Officer. Available at <http://www.ai-cio.com/channel/newsmakers/eurozone-pensions-count-the-cost-of-falling-rates/>

³⁶ Taubenberger, J. and Morens, M. (2006) '1918 influenza: the mother of all pandemics', *Emerging Infectious Diseases* 12(1): 15–22

The mortality rate for the people between ages 20 and 40 increased by more than 10 times during this pandemic. If such a pandemic were to cause a similar death pattern in younger people today, the old-age support ratio could drop to from 6.9 to 6.7 or even 6.2 if deaths are in the 400 million range. There would be a similar effect in 2050. Using Marin’s method for calculating the pension gap, a pandemic flu similar to the 1918–1919 Spanish flu could cause an increase of about USD 1.5–5.0 trillion in the pension gap.

Figure 12: Spanish flu mortality rates



Source: Taubenberger J. and Morens M. (2006) 1918 Influenza: the Mother of All Pandemics; Emerging Infectious Diseases Vol. 12, No. 1.

Civilisation Risks

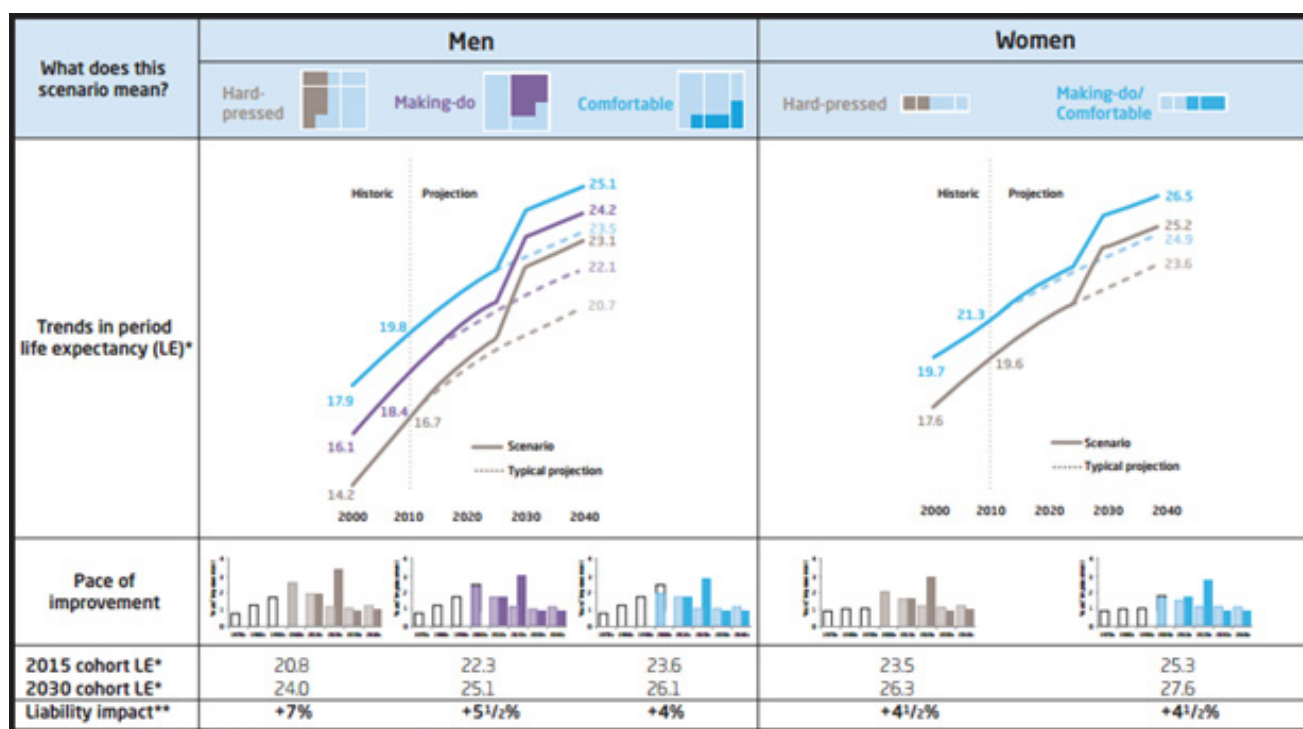
Civilisation risk is another category in the risk fan. Advances in medical science is a technology that fits into the civilian risk category and a cure for cancer would certainly be a medical science advance. A 2014 study performed by the U.K.'s National Association of Pension Funds (Figure 13) showed that an eradication of cancer in 2035 could lead to an increased life expectancy of about 1.5 years on average.

This may not seem like a big enough increase, as cancer deaths account for about 20 per cent of all deaths in the U.S. and 30 per cent for Europe. However, many cancers are developed at advanced ages and are contracted in conjunction with other diseases. If the person does not die

from cancer, he or she will generally succumb to another disease in the near future. In addition, the cure for cancer would probably have a harsh effect on the body, making it more susceptible to other causes of death such as pneumonia or cardiovascular disease. Therefore, the 1.5-year increase in life expectancy does seem reasonable.

And, an increase of 1.5 years of life expectancy, mostly from older ages, will have a large effect on the pension gap. Earlier we looked at Aviva's estimate of the annual pension gap and used an annuity factor to arrive at this paper's definition of the pension gap²¹. Increasing the annuity factor by 1.5 years would add about EUR 3 trillion (USD 3.4 trillion) to the pension gap and this was for the EU only.

Figure 13: Life Expectancy at age 65 for England and Wales assuming cure for cancer



*from age 65 **vs CMI model with CMI starting improvement and 1.5% long-term rate

Source: Reeve, N. (2014)³⁷.

³⁷ Reeve, N. (2014) 'What would a cure for cancer do to your liabilities?', Chief Investment Officer. Available at <http://www.ai-cio.com/channel/risk-management/what-would-a-cure-for-cancer-do-to-your-liabilities/>

Climate change

Climate change would easily fit into the final of the four major risk fan categories, Natural Risks. In fact, climate change has been credited with many of the risks highlighted on the fan.

The World Health Organization, in its paper entitled *Quantitative Risk Assessment of the Effects of Climate Change on Selected Causes of Death, 2030s and 2050s*, estimates that there will be an additional 250,000 deaths per year due to climate change during the years 2030 through 2050.³⁸ While this may not seem like a lot of deaths considering that the world population is projected to be more than 8 billion in 2030 and over 9 billion in 2050, many of the quarter million additional deaths will be younger people. Climate change is expected to increase the death rate due to heat, disease and malnutrition, and these causes of death mostly affect the young.

In the current low fertility rate environment, any additional deaths at younger ages simply exacerbates the problem. Climate change cannot really be considered a mortality shock, as it is a relatively gradual process and, hopefully, there will be mitigating factors to help alleviate both climate change and the mortality associated with it. However, it is certainly an issue that society must continue to address.

In a recent study by Dietz *et al.*,³⁹ the authors describe the increasing pressure that pension funds are under to assess the environmental, social and governance risks of asset holdings. In parallel, the Financial Stability Board's task force on climate-related financial disclosures is scheduled to finalize its proposal to enhance corporate disclosure practices on climate-related risks by early 2017. Collectively, risks from climate change are likely to become a more significant determining factor in the evaluation of asset values. With the continuing low interest rate environment since 2008, pension funds can ill afford additional causes for poor returns.

Also, there have been some studies that point to increased food prices and other associated risks that could cause life

expectancy to drop. This would mostly affect poorer people as well as the very young and very old. The studies are a bit weak on assumptions and do not take into account new technology for growing foods, etc. Therefore, we will not consider this consequence of climate change as having a major effect on the pension gap.

Looking at projected trends in the pension gap is concerning enough, but looking at possible shocks to the system adds even more concern. Other possible shocks that would negatively affect the pension gap are war, which usually kills young men, and famine, which mainly affects the young. In addition, further advancements in technologies such as driverless cars and robotics can continue to take jobs away from humans. Increase unemployment will put pressure on the pension gap.

How big is big?

Everett Dirksen was a United States politician in the mid-20th century. Even though he ran for president in 1944, he is better known as a Republican senator from Illinois and became the senate minority leader in 1959. An interesting fact about Everett Dirksen is that he is best known for a quote that cannot be verified: 'A billion here, a billion there, and pretty soon you're talking about real money'. The interesting thing is that this quote was attributed to him in the 1960s when a billion U.S. dollars was real money, not Bill Gates' pocket change.

This quote comes to mind when attempting to put a value on the worldwide pension gap. There are a few estimates of the pension gap previously cited in this paper and, while they may not be totally in sync, when adjusted for differences, they are in the same range so, what's a few trillion here or there?

For the purposes of this paper, we will continue to use an estimate of the worldwide pension gap to be USD 41 trillion, Marin's calculation minus PAYG contributions. So what does it mean to have a pension gap of USD 41 trillion? Does it mean that if USD 41 trillion magically appeared in a very large box on the prime meridian in Greenwich, England and was distributed fairly that the

³⁸ Hales, S., Kovats, S., Lloyd, S. and Campbell-Lendrum, D. (eds) (2014) *Quantitative Risk Assessment of the Effects of Climate Change on Selected Causes of Death, 2030s and 2050s*, Geneva: World Health Organization

³⁹ Dietz, S., Bowen, A., Dixon, C. and Gradwell, P. (2016) 'Climate value at risk' of global financial assets', *Nature Climate Change*. doi:10.1038/nclimate2972

issue would go away? While the short answer is yes, the current demographics, savings patterns, low interest rate environment and many other factors leads one to believe that the pension gap would begin to grow immediately. The pension gap is a hole that cannot be filled easily—it is a living organism. It grows and shrinks each minute of the day and is affected by many outside influences. Even more importantly, there are certain cultures that affect the pension gap that would also need to change for the gap to be mitigated or eliminated.

SOLUTIONS

Governments

The dramatic increase in life expectancy, especially during the past few decades, has caused governments to reduce Pillar I monthly pension benefits and has caused employers to switch Pillar II pensions from defined benefit to defined contribution plans. This takes longevity and investment pressure off of governments and corporations by transferring these risks to employees.

While corporations and governments strongly encourage Pillar II savings with matching corporate contributions and tax deferrals, many countries still do not require personal contributions to be made. In addition, these voluntary contributions, when made, are generally at a level too low to ensure adequate savings for retirement.

Pillar II defined contribution pensions should, at a minimum, automatically enrol workers and at a high enough level to ensure adequate retirement income.

The preference, however, is for mandatory enrolment into Pillar II pensions. Strongly encouraging or mandating a larger pension contribution at the beginning of a person's worker career will also create a savings culture. It is critical that people begin saving at younger ages and governments continue to encourage this in any way possible, such as through further tax-advantaged savings opportunities to Pillar II and Pillar III pensions.

Governments should further encourage retirement contributions with additional tax-advantaged savings opportunities.

A good example of this is in Switzerland, where Pillar II pensions are mandatory and have a high mandated savings rate. According to a Global Pension Index constructed by the Australian Centre for Financial Studies and Mercer, Switzerland ranks fourth in the world.⁴⁰ The index ranks both the governmental and private pension systems of countries weighting adequacy, sustainability and integrity in the formula. Switzerland earned a grading of B on the 2015 index with only three countries (Denmark, Netherlands and Australia) ranking higher.

⁴⁰ Mercer (2015), Melbourne Mercer Global Pension Index, Melbourne: Australian Centre for Financial Studies.

Another issue with defined contribution Pillar II pensions is a new class of people that will be retiring for the first time in history with a 'pot of gold' (a relatively large accumulated savings sum). The intention is that this sum of money will be used for the duration of the person's retirement. In reality, some if not much of the money will be spent well before the pensioner's death.

Governments should strongly encourage or mandate annuitisation of all or a large portion of Pillar II defined contribution plans.

While this seems like an easy solution to recommend, the current and sustained low interest rate environment causes this to be a more problematic solution. It is difficult to recommend locking in a fixed annuity for life in this environment. Annuities that guarantee fixed income while providing some increase in benefits if markets improve are becoming available in the marketplace and may solve this dilemma.

If all governments would pass regulations to require contributions to Pillar II defined contribution pensions and require annuitisation, it would not only cause people to save more, but it would also begin to change cultures. With old-age retirement becoming such an important issue, would it not be prudent for governments to mandate financial literacy education in schools?

Financial literacy should be part of core education systems around the world.

Financial literacy will help people understand how much money is required to be saved to ensure a decent income in retirement. It can also teach the value of once non-liquid assets such as houses or cars. Retired homeowners can extract money out of their homes with reverse mortgages and retired car owners can extract money out of their cars with peer-to-peer programmes such as Turo (a peer-to-peer car rental company).

This paper would be remiss if it did not advocate for an increase in age to reach 'normal' retirement for a Pillar I pension (normal is defined as the age at which the

person may begin to receive an unreduced pension). Most countries have already begun to increase pension ages, so this is not a new idea. However, many of these increases have a set goal such as age 67. There should not be a limit on the normal retirement age. It should be open-ended and continue to increase as life expectancy increases.

Normal retirement ages to receive unreduced social pensions should continue to increase commensurate with the increase in life expectancy.

It should be noted that many people believe that increasing the age at which Pillar I benefits commence is discriminatory to workers with more labour-intensive jobs such as construction workers and firefighters. For these labour-intensive workers, it is very difficult physically to continue working until the current retirement age, let alone to an ever increasing age.

In addition, contribution rates must be increased in order to keep the social pension systems sustainable. Again, most countries are already doing this, and it can be achieved with higher contribution rates or applying the current rates to increased income amounts (typically, contribution rates are only applied to capped income levels).

Contribution rates for social pensions should increase for employers and individuals until, in conjunction with other solutions, the national system is sustainable based upon realistic actuarial assumptions. And, all defined benefit plans should be funded to the actuarially correct levels.

Effectively attacking a problem must begin with acknowledgement that a problem exists. If governments are required to monitor and report pension funding gaps, this will be the first step toward constructing viable solutions. Transparency is a key step towards solving the issue.

Governments should be required to disclose current pension funding gaps and show expected benefits to future retirees under best estimate assumptions.

Increasing the age at which a pensioner can claim benefits also implies that the individual will continue to work. This extension of the working years is what The Geneva Association refers to as Pillar IV.

Governments and the industry should create more opportunities to allow work past normal retirement age.

Of course, industry will play a major role in allowing workers to remain on the payrolls, but government regulation can also assist in this. In addition, with the ever increasing numbers of seniors above age 65 not yet drawing pensions, new working opportunities will have to emerge. For example, healthier seniors can care for those less healthy, some can work with younger children in day-care programmes and others can use their skills consulting. Plus, newer peer-to-peer models such as Uber and Airbnb can create opportunities for seniors that didn't exist just a few years ago.

Some countries are beginning to explore an increase in work flexibility at older ages. This could help extend working ages and lessen the pension gap crisis. However, there is conflicting evidence as to whether these flexible programmes are viable and whether they actually extend working years or shorten them. Also, corporations may not be keen to offer flexible programmes for older employees.

As we stated earlier, increasing life expectancies is just one of the major issues causing the pension gap. Another major problem is deteriorating support ratios caused by low fertility rates. Increased fertility rates can help the Pillar I pension gap dramatically. Is there a way for governments to incentivise increased fertility? Certainly, China found a way to disincentivise fertility with an urban one-child policy that has recently been changed to a two-child policy. As we have seen before, this policy has hurt China with respect to the pension gap.

Could offering better incentives for having more children such as tax breaks, increased child allowances, mandated affordable day-care centres (staffed with over age 65 workers), reduction in Pillar I pension benefits for having less children, etc. be viable? Even if these measures did encourage increased fertility rates, the effects would not be felt for 15–20 years. Since there is evidence that fertility rates are positively correlated with a strong economy, stimulating the economy may be more effective than any incentives that governments can mandate to families to encourage increased fertility rates.

There are other monetary policies that can have a mitigating effect on the pension gap. Central banks have control of interest rates and as we discussed before, interest rates have a dramatic effect on the assets that pension companies manage and on the value of pension liabilities. An increase in the interest rates can go a long way towards reducing the pension gap.

Another important component of the pension gap is the early death of a major family breadwinner. Numerous articles and papers have been written about the worldwide protection gap, many of which might think that a death might help the pension gap. In fact, the death of a breadwinner exacerbates the pension gap because this breadwinner will no longer be able to save for retirement, the family might actually have to spend monies originally earmarked for retirement and the family may need governmental support which increases the government's portion of the pension gap.

And disability could be worse. Not only does income reduce the disability of a breadwinner, the disabled person must be cared for, savings are reduced and retirement money may be spent on current needs. Zurich Insurance Group recently performed a study in Western Europe which showed the lack of understanding about the probability of disability. Fifty per cent of respondents incorrectly estimated the probability of disability at under 10 per cent, when the correct figure is about 25 per cent. And disability leads to poverty in many cases. In the U.K., more than 50 per cent of disabled people fall into the lowest quintile of income or below the poverty line, according to the Zurich study.

One method to mitigate the protection gap might be to have some level of mandatory life insurance for people who have children or other dependents, for example. While mandatory life insurance may sound a bit extreme, most industrialised countries mandate auto insurance. Mandated life insurance, even at a very low level, not only lessens the protection gap, it helps people learn the value of life insurance and savings. Small cultural changes at early stages in life could be helpful at later stages in life. The programme could be run as one large group insurance policy split by participating insurance companies.

⁴¹ The mission of the Actuarial Foundation is to enhance math education and financial literacy through the talents and resources of actuaries. Its vision is an educated public in pursuit of a secure financial future.

Industry

If governments will not mandate financial literacy as part of national educational systems or is slow to enact it, what is stopping insurance industry organisations in conjunction with trade groups, associations and educators from designing financial literacy courses and bringing them to schools? In the U.S., for example, the Actuarial Foundation⁴¹ has such a programme and has developed excellent materials that range from opening a bank account to understanding how interest works to how retirement annuities work. Unfortunately, the Actuarial Foundation's reach and resources do not allow it to be as widespread as it should be. Insurance industry organisations and trade groups could partner with a charity such as the Actuarial Foundation to bring this message of financial literacy to a larger group of children worldwide.

Insurance industry organisations in conjunction with trade associations and educators should develop a worldwide network to begin teaching financial literacy in all schools.

However, financial literacy, whether mandated on school curricula or taught by the industry and organisations, cannot solve the problem alone. People need easier access to more understandable products with lower fees. For example, the insurance industry could also develop low-fee deferred annuities that must annuitise at a certain age. The current trend in the marketplace is for complex annuities with complicated structures such as guaranteed withdrawal benefits or guaranteed income benefits. Due to complex guarantees, companies need to purchase expensive hedges against these policies causing the fee structure to be high. While there certainly is a place for these products in the market for more sophisticated buyers, these plans may not be the best choice for more moderate income level people.

With the recent passage of legislation in the U.K. and the U.S. making it more difficult for agents to sell these products, it is just a matter of time until simpler and lower-fee annuities are developed. If they can be combined with workplace marketing or even be sponsored by corporations to reach all employees at all income levels, these annuities can make a large dent in the pension gap.

General population

Is it the responsibility of the individual to save for retirement? Even if corporations are switching to non-voluntary defined contribution plans, doesn't at least some of the responsibility to save an adequate amount for retirement fall upon the shoulders of the worker?

While this can easily be argued, it is clear that the average person needs to become better educated with respect to financial literacy so that he or she can be better equipped to handle these difficult questions. Therefore, it is important that individuals take some burden of the pension gap upon their own shoulders and save more for retirement. Kristof Terryn is a member of the Group Executive Committee at Zurich Insurance Group, who made a similar point at a recent meeting:

"There is growing awareness of the pension gap, but most people underestimate an even greater risk to their standard of living: losing the ability to work. Many see the state as the main provider of financial support to those no longer able to work. However, we at Zurich expect to see a gradual reduction in social security benefits and corporate pensions in many countries as populations age and national budgets come under pressure. People increasingly need to take personal responsibility to protect themselves and those they love."⁴²

We have already shown that the death or disability of a family breadwinner can increase the pension gap. Terryn not only makes this point in his comment, he also says that people need to take responsibility to protect themselves and their families.

Workers should educate themselves about the necessity of lifetime savings even at the expense of current luxuries. And, parents should begin educating their children about the benefits of savings as early as possible. It is not the full responsibility of governments and corporations to make this happen.

Conclusion

Improving life expectancies, low fertility rates and the current low interest rate environment have created a perfect storm for pension funding globally. The estimated pension gap is USD 41 trillion and it will take a combined effort by governments, corporations and the general population to begin to mitigate this epidemic. Laws and cultures need to change and this will not be an easy task.

Some of the needed changes are already beginning to be enacted. The window for some of these changes may be shorter than politicians believe. As the populations in most countries continue to age, the political climate will change as well. Older people vote and they will elect politicians who will assure them that their benefits will remain intact.

The insurance industry is in a unique position to mitigate the effects of this epidemic. It has the expertise through its actuaries and underwriters, the tools with its products and services, the appetite to accept risk and the political clout and means to work with governments and society on practical solutions. Otto von Bismarck's statement in 1884 rings as true today as then. People who work their entire lives deserve some security that they will be taken care of in old age or if they become disabled.

⁴¹ Keller, B. personal communication, email, 3 May 2016.

This Geneva Association Report provides an analysis of the existing scope and trajectory of the current pensions crisis and makes recommendations on how to address it.



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